CENTRAL VALLEY
FLOOD MANAGEMENT
PLANNING PROGRAM

FloodSAFE
CALIFORNIA

2012 Central Valley Flood Protection Plan

Environmental Stewardship Scope Definition Work Group Summary Report

DRAFT December 2009

STATE OF CALIFORNIA
THE NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

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1.0 Introduction

Recent legislation directs the California Department of Water Resources (DWR) to prepare a Central Valley Flood Protection Plan (CVFPP) and submit it to the Central Valley Flood Protection Board (Board) by January 1, 2012. The CVFPP will document and assess current performance of the State-federal flood protection system in the Sacramento-San Joaquin Valley and make recommendations to improve integrated flood management[1] (Figure 1-1). The CVFPP is subject to revisions every 5 years thereafter. The 2012 CVFPP will:

- Promote understanding related to integrated flood management from State, federal, local, regional, tribal, and other perspectives (e.g., agriculture, urban, rural, environment, Environmental Justice (EJ), etc.)
- Create a broadly supported vision for improving integrated flood management in the Sacramento-San Joaquin Valley
- Develop new data and information that can be shared for many purposes

The Environmental Stewardship Scope Definition Work Group (ESSDWG) was chartered to provide input to DWR in the scope of environmental stewardship that will be addressed in the 2012 CVFPP. Environmental stewardship is a commitment to responsibly manage and protect natural resources (water, air, land, plants, and animals), and ecosystems in a functional and sustainable manner that ensures they are available for future generations (DWR, 2009).

[1] Integrated Flood Management is an approach to dealing with flood risk that recognizes the interconnection of flood management actions within broader water resources management and land-use planning; the value of coordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability (DWR, 2008).

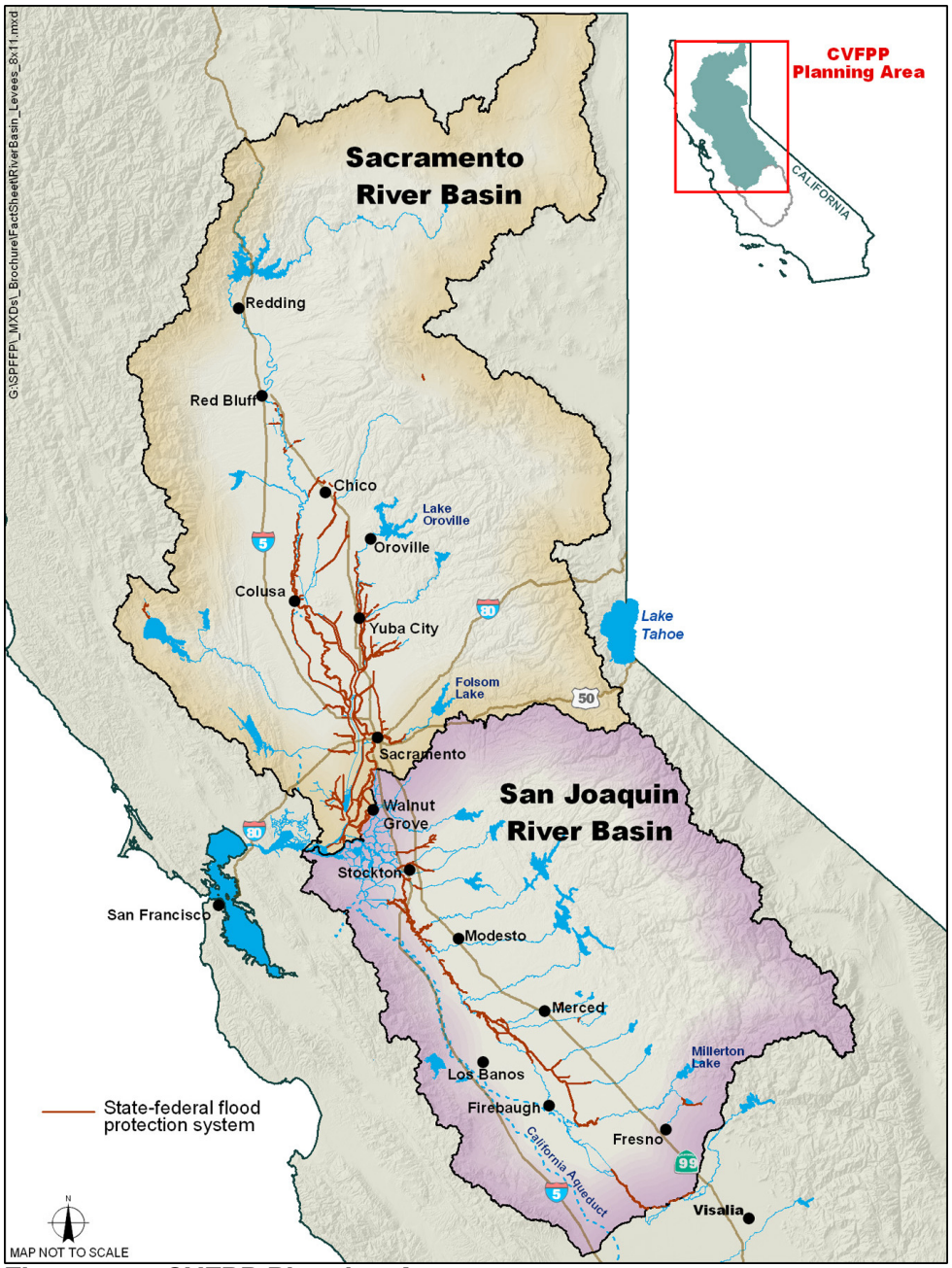

Figure 1-1. CVFPP Planning Area

1.1 Work Group Roles and Responsibilities

The ESSDWG consists of the DWR representatives, volunteer members, and supporting staff.

1.1.1 DWR Representatives

- Ken Kirby, Executive Sponsor, FloodSAFE Executive Advisor
- Marc Hoshovsky, DWR Lead, Central Valley Flood Protection Environmental Planning, FloodSAFE Environmental Stewardship and Statewide Resources Office (FESSRO)
- Michele Ng, Central Valley Flood Planning Office
- Ted Frink, Central Valley Flood Protection Environmental Planning, FESSRO
- Michael Perrone, Division of Environmental Services
- Terri Gaines, Division of Environmental Services
- Elizabeth Hubert, Central Valley Flood Protection Environmental Planning, FESSRO
- Kelly Briggs, Division of Flood Management, Flood Maintenance Office

1.1.2 Volunteer Members

The work group includes the following members and alternates from a broad range of interests and perspectives:

- Lewis Bair, Reclamation District 108, Sacramento River West Side Levee District, Knights Landing Ridge Drainage District
- Chris Bowles, CBEC Inc., Eco Engineering
- Peter Buck, Sacramento Area Flood Control Agency
- John Cain, American Rivers
- Scott Clemons California Riparian Habitat Joint Venture
- Julia Cox, California State Parks

- Ken Cumming, National Marine Fisheries Service
- Anthony Falzone, Trout Unlimited
- Eric Ginney, PWA, Ltd., Environmental Hydrology & Geomorphology
- Tom Griggs, River Partners
- Jennifer Hobbs, U.S. Fish and Wildlife Service (USFWS)
- John Hopkins, Institute for Ecological Health
- Ashley Indrieri, Family Water Alliance
- Clarence Korhonen, City of Elk Grove
- Stefan Lorenzato, Yolo County Flood Control & Water Conservation District
- Michael Picker, Sutter Butte Flood Control Agency
- Geoff Rabone, Merced Irrigation District
- Leon Rofe, California Indian Heritage Council, Wintu
- Terry Roscoe, California Department of Fish and Game (DFG)
- Monty Schmitt, Natural Resources Defense Council
- Nat Seavy, PRBO Conservation Science
- Pia Sevelius, Butte County Resource Conservation District
- Alex Stehl, California State Parks
- Susan Tatayon, The Nature Conservancy
- Tanis Toland, U.S. Army Corps of Engineers
- Mark Tompkins, Trout Unlimited
- Chris Unkel, Ducks Unlimited
- Carl Wilcox, DFG

- Randy Yonemura, California Indian Heritage Council
- Dave Zezulak, DFG

1.1.3 Supporting Staff

- Yung-Hsin Sun, MWH Americas, Inc. (MWH)
- Matt Young, MWH
- Eric Poncelet, Kearns & West
- Ben Gettleman, Kearns & West
- Debra Bishop, EDAW/AECOM
- Lynn Hermansen, EDAW/AECOM

1.2 Work Group Purpose and Scope

The ESSDWG was chartered to provide input on the following questions:

- What are the environmental stewardship and conservation challenges within the project area that should be considered by the 2012 CVFPP? This should include both environmental constraints on the flood management system as well as environmental impacts from the flood management system.
- What types or categories of opportunities are available to address objectives of this environmental stewardship and conservation approach? How can we best coordinate with other planning efforts and improve upon past efforts?
- What are the key principles for guiding the development, integration, and implementation of environmental stewardship features of the CVFPP?
- What are the major environmental goals that should be included in the CVFPP?
- What should be measured to demonstrate that the CVFPP successfully integrates and achieves environmental stewardship and conservation goals?

1.3 Work Group Deliverables

The charge of the ESSDWG is to produce the deliverables listed below. The resulting written material will inform all relevant work to develop content for the CVFPP. The first direct application of the products of the ESSDWG will be in the five Regional Conditions Summary Work Groups. These deliverables are presented in Chapters 2 through 7 in this Summary Report.

- A description of the major environmental challenges, categorized into priority groups, that the CVFPP should address. Additional details about the specific existing conditions and future challenges related to environmental stewardship and conservation will be developed and captured by the Regional Conditions Summary Work Groups.

- A description of major opportunities that the CVFPP should consider for addressing the major challenges, including recommendations for improving upon past efforts and coordinating with current efforts.

- A list of the key principles for guiding the development, integration, and implementation of environmental stewardship features of the CVFPP.

- A list of the major environmental goals that should be included in the CVFPP.

- A description of approaches or measures to evaluate the CVFPP's effective integration and implementation of environmental stewardship elements.

- Recommendations for important documents that should be used as a reference material related to environmental stewardship including existing conditions, challenges, opportunities, goals, and objectives.

1.4 Purpose of this Report

This ESSDWG Summary Report records the outcomes of the group and presents the deliverables identified above in Section 1.3. It serves as the vehicle for providing ESSDWG input to the development of the Regional Conditions Report (RCR), which is the first major milestone report in CVFPP development. This input from the ESSDWG will not become a separate section in the RCR; rather it will be incorporated in sections where

appropriate, similar to the input from other topic and regional work groups. The environmental stewardship concept will be incorporated in all aspects of the planning process.

ESSDWG members will be offered the opportunity to provide input on the draft version of the RCR to ensure that the Plan Development Team incorporates their input properly.

This ESSDWG Summary Report will remain a draft document until the CVFPP is finalized, as will all interim CVFPP documents. Further development of the CVFPP may yield additional improvement to the results documented in this report.

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2.0 Major Environmental Challenges to be Addressed in the CVFPP

The challenges are considered drivers or constraints that influence outcomes. These are ongoing pressures or existing conditions that present challenges to achieving desired goals or objectives. Challenges are grouped into two major categories: Environmental and Human-Based. Environmental challenges encompass the physical and biological processes, and the human-based challenges encompass the institutional, social, political, and economic issues.

The challenges below are coded to reflect the ESSDWG's view on their level of priority for inclusion in the CVFPP. Each of the challenges has been assigned one of the following four priority levels: highest, high, medium, and low.

The priority levels have been informed by input received from ESSDWG members who were invited to rate each challenge under one of the following categories: "extremely important for inclusion in the 2012 CVFPP, "nice to have in the 2012 CVFPP," and "could wait for next iteration of the CVFPP (post-2012), or could be handled elsewhere (e.g., other plans)." The priority levels listed below were subsequently refined by DWR team members to help distinguish among the many challenges that were viewed to be "extremely important."

The criteria for the four priority levels used in this document are as follows:

- **Highest** – Significantly more ESSDWG members placed these challenges under the category of "extremely important for inclusion in the 2012 CVFPP" than under any other category; a minimum of 14 ESSD members rated these challenges as "extremely important."

- **High** – More ESSDWG members placed these challenges under the category of "extremely important for inclusion in the 2012 CVFPP" than any other category, but the voting across the three categories was more evenly distributed.

- **Medium** – More ESSDWG members placed these challenges under the category of "nice to have in the 2012 CVFPP" than any other category. Alternatively, those challenges that received equal votes under the "extremely important" and "nice to have" categories have also been ranked as "Medium." In addition, challenges that received

the majority of votes rating it as "extremely important," but received 10 or more votes in the "nice to have" and "could wait for the next iteration of the CVFPP or could be handled elsewhere" categories were ranked as "Medium."

- **Low** – More ESSDWG members placed these challenges under the category of "could wait for next iteration of the CVFPP (post-2012), or could be handled elsewhere (e.g., other plans)" than any other category.

2.1 Environmental Challenges (Physical, Biological Processes)

The following challenges were formulated with regard to the flood management system as a whole. Although each individual challenge may not be tied directly to the flood management system, there are direct relationships among the function of the ecosystem and the management, physical structures, and maintenance of the flood management system, and water supply and hydropower management.

2.1.1 Disruption of Dynamic River Processes

- **Challenge 1** (**Highest**) – The flood management system, as designed and built, cannot readily accommodate multiple objectives (e.g., critical ecological and physical processes, convey design flood flows, and support water supply management and hydropower).

- **Challenge 2** (**Highest**) – Dams, levees, and bank revetments confine the capacity of river channels and disrupt fluvial geomorphic processes (e.g., channel meander, channel migration, sediment transport) that are required for the long-term physical and biological sustainability of the river ecosystem.

    - Bank revetments and hardscape prevent recruitment of riparian vegetation and eliminate ecological function.

    - Levees and channel incisions disconnect floodplains from their rivers, disrupting or eliminating the suite of ecological processes (e.g., floodwater detention, groundwater recharge, riparian vegetation recruitment, nutrient exchange, sediment deposition, fish rearing) that are supported or enhanced by seasonal floodplain inundation.

- **Challenge 3** (**Highest**) – Dam and flood operation rules at reservoirs alter the in-stream flow regimes necessary to sustain floodplain and riparian habitat, reduce habitat complexity, and limit habitat access for many aquatic and terrestrial species.

- **Challenge 4** (**Highest**) – Dams and other water diversion features create physical barriers to fish passage throughout the river systems.

- **Challenge 5** (**Highest**) – Current standard operating practices for construction and maintenance of the flood management system can negatively affect riparian and wetland habitats, and can fragment remnant habitat into disconnected patches.

    - Levee and floodway maintenance practices and policies reduce or eliminate habitat complexity within river corridors that many native aquatic and terrestrial species are dependent on.

- **Challenge 6** (**Medium**) – The lack of functioning floodplains contributes to impaired water quality because of reduced infiltration and decreased natural treatment.

2.1.2 Delta Conditions

- **Challenge 7** (**Highest**) – The high risk of future levee failures in the Delta reduces the probability of long-term success for restoring terrestrial habitat and tidal marsh on Delta lands below sea level. Failures are more likely in the future with climate change because of increasing sea levels adding pressure on levees.

- **Challenge 8** (**High**) – Hydrodynamic conditions within the Delta, influenced by upstream water flow management and flood management operations, stress aquatic species by reducing the historical salinity gradients under which the species evolved, which in turn creates conditions favorable for invasive species, disrupts aquatic food webs, reduces habitat suitability for native species, and increases predation and competitive pressures on native species.

- **Challenge 9** (**High**) – Flood and water management within the Delta have reduced the amount, quality, and function of both aquatic and terrestrial habitats resulting in reduced diversity and diminished long-term viability of native species.

- **Challenge 10** (**Medium**) – Simplified flow regimes and disturbances associated with construction and maintenance of the flood management system encourage replacement of native species

with invasive species and increase competition for resources (e.g., space, light, nutrients, water) between native and invasive species.

- **Challenge 11** (Medium) – Existing infrastructure (water supply diversion locations, canals, utilities, transportation, homes, buildings, etc.) in the Delta creates conflicts for modifying levees and topography that may be needed for multiobjective flood management planning.

- **Challenge 12** (Medium) – Changes in flood operation or inundation could result in increased methylation of mercury.

- **Challenge 13** (Medium) – Changes in climate or flood operations could increase the mobilization of mercury-contaminated sediments in the flood system.

2.1.3 Climate Change

- **Challenge 14** (Highest) – The projected effects of climate change (e.g., warmer air temperatures, changes in the timing of snow melt and runoff, and extreme precipitation events) will stress the environment, increase flood risk, and exacerbate seasonal changes in water supply.

2.2 Human-Based Challenges (Institutional, Social, Political, Economic)

2.2.1 Conflict Between Habitat and Other Land Uses

- **Challenge 15** (Highest) – Providing for flood management and agricultural/urban water supply needs may conflict with the attainment of ecosystem goals.

- **Challenge 16** (Highest) – Levee setback opportunities may conflict with existing development, geographical constraints, lack of funding, local zoning regulations, local economic considerations, private property rights, water rights, and urban and agricultural uses.

- **Challenge 17** (Highest) – Urban development in floodplains encroaches on existing habitat, eliminates opportunities for habitat restoration and agricultural uses, and puts more lives at risk during floods.

- **Challenge 18** (**High**) – Flood management system operations and maintenance (O&M) have often been based on short-term or localized needs, without a comprehensive, long-term, corridor-based ecosystem sustainability approach.

- **Challenge 19** (**Medium**) – Floodplain restoration may infringe upon water rights and the rights of private landowners.

- **Challenge 20** (Low) – Bank revetments, maintenance activities, infrastructure, and some regulatory requirements associated with habitat restoration projects contribute to the lack of public access within the flood management system and limit options for the future expansion of public access opportunities.

- **Challenge 21** (Low) – The operation of reservoirs for flood management may at times conflict with or limit recreational uses.

- **Challenge 22** (Low) – Negative experiences and public perceptions that have resulted from previous planning efforts (e.g., CALFED Bay-Delta Program (CALFED), Sacramento and San Joaquin River Basins Comprehensive Study) may create a lack of support for local conservation programs.

2.2.2 Regulatory Issues

- **Challenge 23** (**High**) – Permit processes and requirements delay flood maintenance by being complex, inflexible, not well integrated, and time consuming.

- **Challenge 24** (**Medium**) – Regulatory compliance is challenging because of poor coordination among regulating agencies, inconsistent rules interpretation, and a lack of shared understanding and vision among and within agencies.

- **Challenge 25** (**Medium**) – To avoid future liability and the mitigation requirements, local agencies and private landowners can be unintentionally motivated to remove and/or prevent reestablishment of riparian habitat.

2.2.3 Maintenance

- **Challenge 26** (**Medium**) – Levee maintenance is hampered by the lack of flexible approaches for mitigation.

- **Challenge 27** (**Medium**) – Special-status species seasonal work windows constrain when flood management construction and maintenance can occur, and techniques that may be employed.

- **Challenge 28** (**Medium**) – Flood, transportation, and utility infrastructure constrain restoration and flood maintenance activities.

2.2.4 Funding and Agency Coordination

- **Challenge 29** (**Highest**) – A lack of stable, long-term funding and multiple-agency funding streams constrain many aspects of integrated flood management, including the development of a comprehensive, sustainable, ecological corridor-based approach; implementation of projects that achieve multiple objectives and provide multiobjective long-term habitat management; and reducing the long periods between levee maintenance activities, which would reduce the environmental impact and cost of maintenance.

- **Challenge 30** (**High**)[2] – It is difficult to identify the potential impacts and opportunities that the CVFPP will have on habitat within the flood management system (in terms of quantity and location), that will in turn result in potential effects to the recovery of at-risk species.

- **Challenge 32** (**High**)[2] – State and federal budgeting are based on short time periods (1 to 3 years), making it difficult to accommodate opportunities for phased and adaptive development of long-term flood management and environmental planning.

- **Challenge 33** (**Medium**)[2] – Institutional limitations create barriers to coordination and shared responsibility among agencies for cooperative planning, funding, and implementation of projects.

[2] From a DWR perspective, these challenges require further clarification to be useful in the planning process.

New Challenges

Several new challenges were proposed during the ESSDWG Summary Report review period, but were not discussed by the ESSDWG in any meetings. Limited work group comments on these challenges were generally supportive. The challenges read as follows:

- **New challenge pertaining to the conflict between habitat and other land uses (Low) –** Wakes from motorized boating contribute to levee and berm erosion.

- **New challenge pertaining to maintenance (Low)** – Levee maintaining agencies have little incentive to repair bank erosion problems early on, until it is deemed critical, due a lack of any federal or State program to support such early intervention.

DWR staff also offered an alternative to the above maintenance-related challenge that is more explicitly linked to environmental stewardship. This challenge reads as follows:

- **Alternative challenge pertaining to maintenance** – Levee maintaining agencies have little incentive to use well-established and beneficial bioengineering repair techniques on eroding levee banks due to outdated policies and regulations and lack of understanding of updated scientific research and applications.

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3.0 Major Opportunities to be Considered in the CVFPP

The work group developed a list of opportunities for addressing the major challenges. These opportunities represent possible tools or strategies that could be considered in developing the CVFPP to address the above challenges. They are not recommended goals or objectives and they were not ranked in any priority order by the work group. These opportunities are grouped into two categories: Physical Strategies and Policy/Management Strategies. The Physical Strategies category represents actions that directly result in changed physical conditions. The Policy/Management Strategies represent management actions that indirectly affect physical conditions.

3.1 Physical Strategies

- **Opportunity 1** – Reoperate reservoirs to recreate a more natural hydrologic regime that improves ecological function and addresses the goals of the flood management and water supply system, and provides flexibility to address changes in climate, regulations, and scientific understanding.
    - Increase reservoir management flexibility by using advanced weather forecast-based operations and making improvements to physical infrastructure (e.g., reconfiguring/modifying dam outlet features or constructing auxiliary spillways)
- **Opportunity 2** – Increase and enhance floodway capacity (e.g., with setback levees, new or enlarged flood bypasses) to:
    - Rehabilitate and accommodate fluvial geomorphic processes and flow regimes
    - Convey and store larger flood flows
    - Increase the quantity, diversity, and connectivity of floodplain, aquatic, and wetland habitats
    - Provide public access for education and recreation

  - Enable the reduction of flood reservation space in upstream reservoirs, hence increasing the supply of water for consumptive and environmental uses

  - Address potential flood control impacts associated with climate change, such as more frequent or more extreme precipitation events and altered timing of snow melt and runoff

- **Opportunity 3** – Develop other hydrogeomorphic and ecological science-based approaches to flood management, including O&M practices that combine an understanding of ecosystem functions with opportunities to increase flood protection and reduce O&M costs.

- **Opportunity 4** – Pursue a variety of structural and nonstructural solutions to address O&M issues and reduce the frequency and consequences of flooding.

- **Opportunity 5** – Develop a flood management plan with a systemwide integrated approach for river floodplain and ecosystem functions that can improve public safety and provide multiple public benefits.

- **Opportunity 6 –** Develop new O&M manuals and plans that are complimentary to and support a multiple-benefit systemwide flood plan and uses scientifically based approaches that support natural floodplain hydrology and ecosystem functions and habitat.

- **Opportunity 7 –** Develop or use available new hydraulic models and new climate change-based hydrology to inform and create more comprehensive systemwide flood management plans that increase the capacity of the flood system to hold and convey flood flows, reestablish frequently activated floodplains, support riverine ecosystem functions and habitat, and that address adaptation strategies to create more sustainable, functional, and durable flood management systems and facilities.

- **Opportunity 8** – Develop and implement comprehensive regional advance mitigation banks.

- **Opportunity 9** – Integrate multiobjective uses (e.g., flood water detention, habitat restoration, recreation, agriculture).

- **Opportunity 10** – Discourage the establishment of new invasive species, prevent the spread of existing infestations, and reduce the extent of existing infestations within the flood management system.

3.2 Policy/Management Strategies

3.2.1 Collaboration and Coordination

- **Opportunity 11** – Collaborate with other programs on funding mechanisms and approaches (e.g., Bay-Delta Conservation Plan (BDCP); CALFED, Federal Energy Regulatory Commission (FERC) licenses; San Joaquin River settlement; National Resources Conservation Service (NRCS) and Farm Bill; State Water Project, Habitat Joint Ventures, California Department of Fish and Game (DFG) state wildlife plans, California Department of Transportation blueprint plans, California Water Code Section 12585.7 for small flood management projects).

- **Opportunity 12** – Adopt a collaborative, corridor-based approach to the flood management planning process that includes State, federal, and local government agencies, nonprofit organizations, and local landowners and that ensures multiobjective projects. Share more responsibility among State, federal, and local agencies to facilitate the decision making process.

- **Opportunity 13** – Leverage existing programs and planning efforts (e.g., BDCP, Riparian Habitat Joint Venture, Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), Integrated Regional Water Management Plan (IRWMP), climate change adaptation policies, California State Parks Central Valley Vision) to develop programmatic and regional, rather than local and piecemeal, conservation and restoration plans as part of a systemwide flood protection plan. Consider existing habitat preserves (e.g., State and federal wildlife areas, State parks, land trust properties, NRCS lands) during this process.

- **Opportunity 14** – Align new infrastructure, such as setback levees, with other infrastructure projects such as roads, to leverage funding from multiple agencies, increase construction and maintenance efficiency, combine mitigation efforts, and accomplish multiobjective projects and maintenance.

- **Opportunity 15** – Engage with Native American representatives to preserve sacred sites and incorporate traditional knowledge into flood management policies, projects, and maintenance activities.

- **Opportunity 16** – Consider delegation of management of habitat projects and funding to local land trusts, other non-governmental organizations (NGO), Resource Conservation Districts (RCD) and State Parks to provide economies of scale and help reduce management costs.

- **Opportunity 17** – Define key environmental stewardship terms (e.g., floodplain capacity) to improve common and shared understanding.

3.2.2 Private Lands

- **Opportunity 18** – Explore the use of voluntary flood easements where feasible to accommodate flood waters, preserve agricultural land, and provide habitat.

- **Opportunity 19** – Modify the Williamson Act to better accommodate or include habitat enhancement as a protected land use.

- **Opportunity 20** – Support agriculture by developing a means to compensate landowners for ecosystem goods and services provided by private lands (financial incentives, types of insurance, etc.).

- **Opportunity 21** – Recognize the importance of, and the potential for, agricultural landscapes to improve water quality and conserve habitat.

3.2.3 Regulatory Considerations

- **Opportunity 22** – Develop integrated planning and permit method(s) for the flood management system (e.g., regional general permit, NCCP, HCP) and collaborate with other efforts.

- **Opportunity 23** – Develop a science-based regional variance for vegetation management on levees while assuring public safety; to be adopted by U.S. Army Corps of Engineers.

- **Opportunity 24** – Revise the existing O&M manuals using the best available scientific and technical data to acknowledge and support multiple objectives.

- **Opportunity 25** –Expand use of Safe Harbor agreements to encourage habitat development on private lands and adjacent public lands.

3.2.4 Other

- **Opportunity 26** – Ensure that the best available scientific and technical data is employed in plan development and encourage the development or refinement of additional models, data, tools, and other resources that could enhance the flood management planning process in the future.

- **Opportunity 27** – Create economic and legislative incentives to reduce new urban development in high-risk floodplains.

- **Opportunity 28** – Develop long-term ecosystem function, habitat, and species baseline abundance targets, to provide a measure of success for the flood plan.

- **Opportunity 29** – Include lessons on multi-objective flood management into school curricula to influence long-term behavioral change and to connect the stewardship ethic and practices to K-12 education.

- **Opportunity 30** – Use ecological and economic models to plan, prioritize, and evaluate opportunities for multiobjective action.

New Opportunities

Several new opportunities were proposed during the ESSDWG Summary Report review period, but were not discussed by the ESSDWG in any meetings. Limited work group comments on these challenges were mixed. The challenges read as follows:

- **New opportunity pertaining to physical strategies** – Additional surface storage and increased conjunctive groundwater management may improve flexibility within the water management system to help satisfy water supply, flood management, water quality, and ecosystem objectives.

- **New opportunity pertaining to regulatory considerations** – Avoid the use of nonnative plants in revegetation efforts and remove all nonnative species from approved lists in the current Board flood system regulatory standards (Article 8, Section 131).

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4.0 Key Principles for Guiding Environmental Stewardship in the CVFPP

The following principles provide a framework for successfully integrating environmental stewardship into the CVFPP. They are stated as basic premises, describing key features of both the planning process and the natural environment that the CVFPP should address and incorporate for a successful plan. They are not presented in any priority order. CVFPP is also guided by a broader set of FloodSAFE planning principles that guide all aspects of the program.[3]

- **Principle 1: Long-term Sustainability** – A robust flood management system is based on a long-term vision that maintains, improves, and enhances social, ecological, and economic viability and meets long-term objectives with minimal maintenance under existing and expected future climate conditions.

- **Principle 2: Multiple Ecological Benefits** – Effective flood management provides multiple ecological benefits,[4] including:

    - Promoting and reestablishing important dynamic hydrologic and geomorphic processes

    - Improving habitat quantity, diversity, and connectivity, including the agricultural and ecological values of these lands

    - Contributing to the recovery of listed species, conservation of native species populations, and maintenance of overall biotic community diversity

- **Principle 3: Multiple Geographic Scales and Time Frames** – Effective flood management planning integrates environmental stewardship at multiple geographic scales (including regional, landscape, or river corridor and local project levels) and over

[3] The FloodSAFE Guiding Principles are described in the Strategic Plan (DWR,2008) (http://www.water.ca.gov/floodsafe/docs/FloodSAFE_Strategic_Plan-Public_Review_Draft.pdf)

[4] These multiple ecological benefits are also part of the CVFP Act requirements (California Water Code Section 9616)

multiple time frames (near to long term). It recognizes the need for regional solutions while being sensitive to specific local conditions.

- **Principle 4: Early and Integrated Environmental Planning –** Effective flood management planning addresses and integrates environmental stewardship concepts early in all planning stages, including the initial project concept and design stages; uses well-integrated and balanced interdisciplinary teams when defining problems, opportunities, and management actions and when selecting preferred alternatives; coordinates and integrates planning and permitting among agencies, including land use and infrastructure; and engages a variety of conservation partners, including private interests and organizations.

- **Principle 5: Broader Description of Costs and Benefits –** The description of costs and benefits of flood projects include a variety of environmental, agricultural, and other societal costs and benefits. These include, for example the costs of long-term management of associated restoration, as well as benefits to society derived from environmental improvements (e.g., soil replenishment, better water quality, and flood risk reduction).

- **Principle 6: Variety of Approaches –** Effective flood management includes using a variety of approaches for achieving goals and multibenefit objectives, including structural and nonstructural means for enabling or improving systemwide riverine ecosystem function.[5]

- **Principle 7: Ecological Flow Regimes and Floodplain Processes –** Effective flood management includes maintaining flow regimes that support natural flood processes, including sediment transport, river channel migration, and vegetation recruitment.

- **Principle 8: Science-based Solutions, Ecological Monitoring, and Adaptive Management –** Effective flood management and planning uses a structured monitoring and adaptive management system to assess progress and to seek more effective approaches to achieving goals, is based on the best available science, and seeks to continually improve the scientific basis of planning decisions.

[5] These variety of approaches are also part of the Central Valley Flood Protection Act requirements(California Water Code Section 9614)

5.0 Major Environmental Goals to be Included in the CVFPP

This list of environmental goals has been developed from three sources: goals for the FloodSAFE Program; objectives specified by the California State Legislature in Assembly Bill (AB) 5 (Senate Bill (SB) 7), SB 5, and AB 156, and subsequently incorporated in the California Water Code; and "challenges" and "opportunities" developed during the August 28, 2009, meeting of the ESSDWG.

Initially, these goals were developed by summarizing, grouping, and condensing the challenges and opportunities developed by the ESSDWG. Once this initial list of goals was prepared, the FloodSAFE Program goals and the objectives contained in the above-referenced legislation were reviewed and additional goals were added where necessary to include ideas or themes not already reflected in the initial goal set. Work group ideas discussed during the September 17 and 30 work group meetings, as well as subsequent written comments, have been integrated into the present version.

The revised goals below represent a significant synthesis of the most critical input received. A number of the earlier goals, because of their specificity, have been recategorized as "opportunities" that can later be used to inform the development of CVFPP "objectives."

5.1 Overarching Goals

- **Goal O1** – Modify and improve the flood management system so that it is adaptable and resilient to future conditions (e.g., climate change and increasing populations), improves public safety, and rehabilitates the key physical processes and ecological functions required to yield ecosystem goods and services that recover and sustain native species.

- **Goal O2** – Reduce conflicts between the need for flood conveyance and the values that river ecosystems provide and support including water supply, fish and wildlife habitat, recreation, agriculture, and cultural heritage sites.

- **Goal O3 –** Develop a flexible management, implementation, and monitoring program (governance structure) that uses state-of-the-art

science and analytical tools to inform decisions, responds to new information, and solicits input from diverse interest groups and cultures to ensure that the plan accommodates changing climate conditions, and changes to ecological, social, and economic values and ideals over time.

5.2 Land Use and People

- **Goal LP1 –** Foster environmental stewardship by providing opportunities for public education, access, recreation, and Native American communal activities on public lands within the flood management system.

5.3 Finance

- **Goal F1 –** Establish long-term funding opportunities including non-governmental sources of funding and develop mechanisms within commerce and governments to support floodplain management in perpetuity.

5.4 Operations and Maintenance

- **Goal OM1 –** Reduce the adverse environmental impacts associated with ongoing maintenance of the flood management system while maintaining flood conveyance.

- **Goal OM2 –** Reduce regulatory burdens related to future O&M needs of the flood management system, and encourage programmatic approaches to environmental compliance that are based on a watershed (or system) approach but that consider site-specific resources.

6.0 Indicators of Success for the CVFPP

This section includes guides for CVFPP development processes and CVFPP content to ensure that environmental stewardship considerations are successfully integrated (See Tables 6-1 and 6-2).

6.1 Process Guide

This process guide (Table 6-1) is intended for use by the CVFPP Plan Development team to help ensure that environmental stewardship considerations are integrated successfully into the 2012 CVFPP. This document describes tangible steps the Plan Development Team should take while developing the CVFPP. This process guide is to be used with the associated content guide that describes how the quality of the 2012 CVFPP will be evaluated as it relates to environmental stewardship considerations.

Table 6-1. Process Guide

Desired Action	Indicator	Target
Engage broad representation of environmental stewardship advocates during each of the 12 steps[1] in the CVFPP development process.	Type of environmental stewardship advocates that participate in each planning step.	The following types of environmental stewardship advocates should be represented: agriculture, tribal, State, federal, and local resource agencies, academic, public trusts, nonprofit interests, and levee protection agencies.
	Diverse groups represented by participants in each planning step.	At least two to three groups that represent the above interests should be included in the CVFPP development process.
Ensure that multidisciplinary teams are involved in identifying potential management actions, formulating solution sets, evaluating solutions sets, refining solution sets, and crafting recommendations for State action.	Number of disciplines involved in each of these steps.	The following disciplines should be involved in these steps: hydrology, geomorphology, biology, ecology, cultural anthropology, engineering, agriculture, recreation administration, and natural-resource economics.
	Number of people within specific disciplines included in these steps.	At least three people representing the specific disciplines should be involved in these steps.
Conduct equitable level of technical analysis for environmental stewardship objectives as compared to the other objectives.	Make use of the best available technical information and quantitative methods related to environmental stewardship objectives including conceptual models (e.g., DRERIP).	The best available information and quantitative methods will be identified during the "Define Evaluation Methods & Screening Criteria" step in the CVFPP development process.
Promote improved understanding of specific objectives and desired actions being advocated by various interests in the CVFPP.	People representing a particular perspective (regional and topic based) can articulate what people representing different perspectives would like to see happen as a result of the CVFPP.	Conduct a series of round-robin discussions where people "take on" their colleagues' perspective and describe it, and then get feedback from people participating in the round-robin discussion.

Note:
[1] As defined in the "Planning and Engagement Process for Developing the Central Valley Flood Protection Plan."

Key:
CVFPP = Central Valley Flood Protection Plan
DRERIP = Delta Regional Ecosystem Restoration Implementation Program

6.2 Content Guide

This content guide (Table 6-2) is intended for use by the CVFPP Plan Development Team to help ensure that environmental stewardship considerations are integrated successfully into the 2012 CVFPP. It is designed to help the 2012 CVFPP sustainably balance environmental, social, and financial needs.

This content guide was developed based on input provided by the work group members during the September 30 meeting. The content guide identifies and describes key actions to be measured and then provides three levels by which content quality can be evaluated. The key actions defined in this guide address the principles and goals identified in previous sections of this document.

Table 6-2. Content Guide

#	Key Action Measured	Description	Evaluating Content Quality		
			Successful Integration	Partially Successful Integration	Not Successful Integration
1	Identify and Describe Existing Conditions for Processes and Habitat	Identify, describe, and quantify (1) physical and ecological processes, and (2) key species and their habitat that are affected by the flood management system in the Sacramento-San Joaquin Valley and Delta.	The plan identifies and describes important physical and ecological processes, habitats and key species and their relationship to the flood management system. It describes cause-and-effect conceptual relationships for many species and ecosystems, and provides GIS-based maps to identify where the processes, species, and habitats are affected by the flood management system.	The plan identifies and describes important physical and ecological processes, habitats, and key species and their relationship to the flood management system. The plan inadequately describes cause-and effect conceptual relationships. GIS-based maps are not included, or are insufficient.	The plan does not identify or describe important physical and ecological processes, habitats, and key species.
2	Builds on Existing Data and Lessons Learned	Identify and build on previous conservation planning efforts in the Sacramento-San Joaquin Valley and Delta (both written and GIS-based datasets), incorporate lessons learned, and avoid duplicate efforts.	The plan provides a comprehensive summary of other relevant large-scale conservation planning efforts, including a description of key lessons learned by each effort). The plan builds on these efforts and incorporates lessons learned.	The plan provides a comprehensive summary of other relevant large-scale conservation planning efforts, but does not incorporate the lessons learned from these efforts.	The plan does not make an attempt to build on other relevant conservation planning efforts.
3	Identify Key Data Gaps, Assumptions, and Areas of Uncertainty	Identify key data gaps, assumptions, and areas of uncertainty affecting integration of environmental stewardship into the 2012 CVFPP; and recommend a stepwise approach to the development or refinement of additional models, data, tools, and other resources that could enhance future integration of environmental stewardship into the flood management planning process.	The plan identifies a comprehensive set of key data gaps, assumptions, and areas of uncertainty; and provides recommendations, including specific steps to take, for closing each data gap, validating assumptions, and reducing uncertainty.	The plan identifies key data gaps, assumptions, and areas of uncertainty, but it does not provide recommendations to close these gaps.	The plan does not identify any data gaps, assumptions, and areas of uncertainty and/or recommendations for closing data gaps.

Table 6-2. Content Guide (contd.)

#	Key Action Measured	Description	Evaluating Content Quality		
			Successful Integration	Partially Successful Integration	Not Successful Integration
4	Rehabilitate and Sustain Physical and Ecological Processes	Develop SMART objectives and management actions to rehabilitate and sustain key physical processes and ecological functions, including: (1) floodwater conveyance, groundwater recharge, and other hydrologic functions; (2) sediment transport and retention, and geomorphic processes including channel meander; (3) nutrient cycling, and the retention, removal, and degradation of pollutants; and (4) growth, reproduction, and dispersal of terrestrial and aquatic organisms.	The plan contains SMART objectives and management actions that will enhance and sustain (in the context of climate change) each of the listed set of functions.	The plan contains SMART objectives and management actions that will enhance and sustain (in the context of climate change) for some of the listed functions.	The plan does not contain SMART objectives and management actions that will enhance and sustain any of the listed functions.
5	Restore and Enhance Aquatic, Wetland, and Riparian Ecosystems	Develop SMART[7] objectives and management actions to increase and improve the (1) quantity, (2) diversity, and (3) connectivity of (A) riparian, (B) wetland, (C) shallow floodplain, and (D) shaded riverine aquatic habitats within the flood management system linking these objectives and management actions to key species identified in #1 and processes identified in #4. Provide GIS maps depicting potential locations for restoration.	The plan contains SMART objectives and management actions that will result in a net increase in the three listed attributes for each of the four listed ecosystems and provides a GIS map to depict potential locations for restoration. The objectives and management actions for habitat improvements are linked to key species and their habitat requirements.	The plan contains SMART objectives and management actions for some of the attributes for some of the communities. OR, the plan contains objectives and management actions for all of the attributes and communities, but the objectives and management actions are not tied to key species habitat requirements.	The plan does not contain SMART objectives and management actions that will result in a net increase and/or improved habitat conditions.

Table 6-2. Content Guide (contd.)

#	Key Action Measured	Description	Evaluating Content Quality		
			Successful Integration	Partially Successful Integration	Not Successful Integration
6	Reduce Conflicts between Flood Conveyance and Other Ecosystem Functions and Values	Identify existing or potential conflicts between flood conveyance and the other functions and values, including: (1) water supply, (2) fish and wildlife habitat, (3) recreation, (4) agriculture, and (5) cultural heritage sites and provide solution sets to reduce the conflicts.	The plan identifies conflicts between flood conveyance and each of the five listed functions and values, and includes actions to reduce identified conflicts with each of the five listed functions and values.	The plan includes actions to reduce conflicts for some listed functions and values.	The plan does not include actions to reduce conflicts for any of the listed functions and values in the plan.
7	Support the Recovery of Threatened and Endangered Species	Describe actions that support the recovery of threatened and endangered species associated with the flood management system.	The plan includes actions that contribute to the recovery of all sensitive, threatened, and endangered species associated with the flood management system.	The plan includes actions that contribute to the recovery of some threatened and endangered species associated with the flood management system.	The plan does not include actions that contribute to recovery of threatened and endangered species associated with the flood management system.
8	Encourage Compatible Multiple Uses of Flood Management System	Describe actions that encourage compatible multiple uses of the flood management system, including (1) public education, (2) public access, (3) recreation, and (4) Native American communal activities in the flood management system.	The plan includes actions that address all four of these uses.	The plan includes actions that address one to three of these uses.	The plan does not include actions that address any of these uses.
9	Control and Reduce Invasive Species	Describe comprehensive guidance including management actions to (1) discourage the establishment of new invasive species, (2) prevent the spread of existing infestations, and (3) reduce the extent of existing infestations within the flood management system.	The plan includes management actions that address all three of these invasive species issues for all of the major invasive species in the flood management system.	The plan includes management actions that only partially address all three of these invasive species issues; or only addresses them for a small set of invasive species.	The plan does not address any of these three issues.

Table 6-2. Content Guide (contd.)

#	Key Action Measured	Description	Evaluating Content Quality		
			Successful Integration	Partially Successful Integration	Not Successful Integration
10	Support the Conservation of Agricultural Lands for Environmental Stewardship	Describe actions that improve the effectiveness of agricultural landscapes to improve water quality and conserve habitat. Provide specific management actions that will maintain and increase the value of agricultural land for water quality and habitat.	Includes management actions for agricultural lands that provide mutual benefits to agriculture, water quality and wildlife within the flood management system.	Agricultural landscapes are considered in some solution sets related to water quality and habitat. The plan does not describe wildlife friendly and water quality best management practices.	The plan does not consider the benefits of agricultural landscapes in solution sets.
11	Minimize Environmental Effects of Maintaining Flood Management System	Ensure that all CVFPP actions strive to minimize, and compensate for, the negative environmental effects to (1) natural processes, (2) water quality, (3) special-status species, and (4) native vegetation and wildlife species, associated with ongoing maintenance of the flood management system while maintaining flood conveyance	The plan contains a comprehensive set of actions to minimize, and compensate for, the negative environmental effects of maintenance activities to all four components identified.	The plan contains actions to minimize, and compensate for, negative effects, but it is not a comprehensive set and does not address all four components.	The plan does not include minimization or compensatory actions.
12	Improve Efficiency and Effectiveness of Environmental Compliance	Describe actions that improve efficiency and effectiveness of compliance with environmental regulations by the flood management system.	The plan includes actions to improve efficiency and effectiveness of complying with each major environmental regulatory process.	The plan includes actions for more efficient compliance with some, but not all, of the major environmental regulatory process,	The plan does not include actions for more efficient compliance with any of the major environmental regulatory processes.

Key:
ESSDWG = Environmental Stewardship Scope Definition Work Group
GIS = Geographic Information System
SMART = Specific Measurable Achievable Results-oriented Time-base

Additional indicators of success were identified by the ESSDWG for the content guide, but are considered more suitable for subsequent updates after the 2012 CVFPP, as additional time and efforts would be required to achieve meaningful milestones for these items. These items are listed below.

- Alleviate costs of environmental stewardship; identify a sustainable, accountable, funding approach to pay for ecosystem improvements.
- Identify milestones and monitoring requirements to gage the implementation success of environmental stewardship objectives, solution sets, and management actions between 2012 and 2050 and provide an adaptive management strategy.
- Describe the benefits of incorporating environmental stewardship into the plan.
- Identify the parties who will be responsible for plan implementation and subsequent monitoring efforts.

7.0 Key Environmental Stewardship References for CVFPP Development

ESSDWG members provided input on a list of environmental stewardship references, which is a subset of a larger list of references used for CVFPP development. The purpose of this list is to provide insight about potential varying views about each reference to the CVFPP Development Team. A key effort in CVFPP development is to capture a variety of perspectives.

Work group members provided their input by categorizing each reference by its relative importance, and included narrative comments as to why the category was chosen. Members also supplied additional references deemed to be relevant to environmental stewardship in the CVFPP.

While only a limited number of work group members provided comments on the reference list, there was broad disagreement over the quality and utility of several of the listed documents. This input will be considered as the reference list developed by the ESSDWG is integrated with the overall list being compiled for the CVFPP. DWR is in the process of developing an online repository of all CVFPP reference documents, which will be available to work group members and the public.

The following list includes the references that were reviewed and contributed by ESSDWG members.

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8.0 Acronyms and Abbreviations

AB	Assembly Bill
BDCP	Bay-Delta Conservation Plan
CALFED	CALFED Bay-Delta Program
Board	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EJ	Environmental Justice
ESSDWG	Environmental Stewardship Scope Definition Work Group
FERC	Federal Energy Regulatory Commission
FESSRO	FloodSAFE Environmental Stewardship and Statewide Resources Office
FloodSAFE	FloodSAFE California
GIS	Geographic Information System
HCP	Habitat Conservation Plan
IRWMP	Integrated Regional Water Management Plan
NCCP	Natural Community Conservation Plan
NGO	Non-governmental Organization
NRCS	National Resources Conservation Service (NRCS
O&M	Operations and Maintenance
RCD	Resource Conservation District
RCR	Resource Condition Report
SB	Senate Bill

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